Research Product 85-26

User's Manual for Predicting Military Task Retention (Revised, June 1985)

Training and Simulation Technical Area
Training Research Laboratory

July 1985

U. S. Army Research Institute for the Behavioral and Social Sciences

U. S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES

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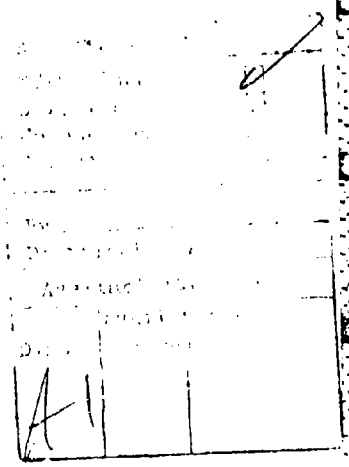

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A methodology was developed whereby unit commanders and trainers can estimate unit proficiency on individual tasks over periods of no practice. The method will enable persons making training decisions to organize training schedules to maximize unit readiness. The method consists of 10 rating questions concerning the retention characteristics of individual tasks: the presence and quality of job aids, the number of steps required to complete the task, the requirement to complete all or part of the task steps in a certain sequence or within a given time limit, the presence of (Continued)

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feedback for correct or incorrect performance, the character and level of mental demand, and the level of motor control required to do the task.

The purpose of the project for which this user's manual was prepared was to train U.S. Army representatives from various proponent schools and other activities to use the method in their training program. Three training sessions of 3 days each were conducted. During the training the user's manual (ARI Research Product 85-13) served as the principal reference source and thus was the most authoritative description of the rating method. The training sessions revealed certain difficulties in the wording, explanations, and definitions presented in the manual. In specific areas, the user's manual required further explanation or revision, and this version of the user's manual incorporates the required modifications. The specific changes made in the manual include an increased emphasis on the preconditions necessary to apply the rating method correctly.

In particular, the revised manual emphasizes the need for a complete and accurate summary of the tasks being rated, the desirability of using a team when rating tasks, and the limitations inherent in the rating method when applied to certain classes of tasks. In addition to these general changes, the rating questions and their accompanying definitions and explanations were revised or expanded in response to specific problems identified during the training.

Research Product 85-26

User's Manual for Predicting Military Task Retention (Revised, June 1985)

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Education and Training

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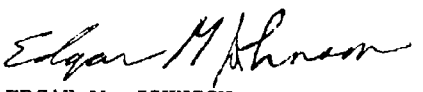
FOREWORD

The decline in task performance caused by forgetting is a critical training problem in the Army. One of the trainer's primary responsibilities is to ensure that soldiers remain proficient on tasks they have already learned. This means doing periodic refresher or sustainment training because soldiers forget tasks not regularly practiced in the unit. Unfortunately, unit training resources are scarce, and no method has been available to help the trainer identify tasks that either have been or are about to be forgotten.

In response to this need, the Army Research Institute has developed an easy-to-use method for predicting how rapidly individual tasks will be forgotten over no-practice intervals of up to 1 year. The method has been developed in both paper-and-pencil and computer-based format and is geared to help trainers decide which tasks are most likely to be forgotten, how many soldiers will be able to perform a task correctly after given intervals of no practice, and when and how often sustainment training should be conducted. Such information can help in targeting sustainment training effectively to obtain maximum payoff from limited training resources.



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TRAINING PROGRAM FOR PREDICTING MILITARY TASK RETENTION:
USER'S MANUAL (REVISED, JUNE 1985)

EXECUTIVE SUMMARY

Requirement:

To prepare a user's manual to enable U.S. Army personnel to apply a methodology for estimating unit proficiency on individual tasks over periods of no practice.

Procedure:

This manual represents the most recent version of a user's manual describing a method for estimating proficiency on military tasks over periods of no practice. The manual incorporates the comments and recommendations of the Army Research Institute for the Behavioral and Social Sciences and the Army Training Board, as well as the observations developed during a 3-day training program conducted at three locations. An earlier version of the manual was used as a training guide during this program. The training sessions revealed areas where the existing manual required revision and clarification. This manual reflects those observations.

Findings:

Additional guidance was provided to users on the need for adequate task descriptions when applying the rating method; the desirability of using rating teams; the application of the method to training decisions; and specific limitations to the method with respect to certain classes of tasks. In addition, each of the rating questions or the accompanying explanations and definitions was revised or expanded to clarify the method to the user.

Utilization of Findings:

The revised manual could be disseminated to training program participants or to other trainers interested in applying the retention prediction method.

TRAINING PROGRAM FOR PREDICTING MILITARY TASK RETENTION:
USER'S MANUAL (REVISED, JUNE 1985)

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TRAINING PROGRAM FOR PREDICTING MILITARY TASK RETENTION: USER'S MANUAL (REVISED, JUNE 1985)

I. INTRODUCTION

A major responsibility of the military trainer is to ensure that soldiers remain proficient on tasks previously learned. Because soldiers forget tasks that are not practiced on a regular basis, periodic sustainment training is required. However, resources for such training are often limited. The problem, then, is to make the best use of these limited resources to get the greatest training payoff.

Ideally, training resources should be spent only on tasks that have dropped or are about to drop below the desired level of proficiency. Identifying these tasks has been difficult because trainers have had to rely on best guess estimates, based on observed or reported deficiencies, when determining what and when to train (i.e., reactive mode). Until now, no validated method has been available to help the trainer plan sustainment training based on predetermined levels of proficiency (i.e., proactive mode).

The Army Research Institute for the Behavioral and Social Sciences (ARI) has been investigating the problem of forgetting over the past few years and now has a method to help the trainer. Under contract to ARI, the American Institutes for Research developed a method for predicting how rapidly individual tasks, once learned, are forgotten over intervals of no practice. The results produced by this method will be useful to those who have to decide which individual tasks to train and how often to schedule training.

The method requires that each task be rated on how easy it is to remember. This rating score is based on whether or not a task contains characteristics known to influence retention, such as whether or not it is memory aided and how many performance steps it requires. Each task is rated by answering one question on each of 10 task characteristics. The answer to each question is given a numerical scale score. When added together these scores constitute a task's retention rating score. The lower the score, the quicker the task will be forgotten.

It should be noted that the task-retention rating method does not address the difficulty of learning a task, only the difficulty of retaining it. Some tasks may be easy to learn but hard to retain. Others may be hard to learn but easy to retain. The task-retention rating method also does not address the issue of how to carry out training. Finally, the rating method assumes that a task will be performed by a group of typical soldiers who have been trained previously to proficiency on the task.

Who Should Do Task Ratings?

Persons having a detailed knowledge about how the task to be rated is or should be evaluated should do task ratings. Proponent schools define the standards, conditions, and performance measures for individual tasks, and therefore school personnel are in the best position to rate their proponent tasks.

How Should the Rating Process Be Carried Out?

To obtain accurate ratings more than one person within a school should rate each task. Any differences in the rating scale assigned to a task can then be resolved through discussion. Such differences may reflect matters of fact (e.g., Is there a job aid or not?) or matters of judgment (e.g., How good is the job aid?). If the raters cannot reach consensus on judgment differences, the majority opinion should be taken as the correct rating. Ties could be broken by the senior rater. It is not permissible to resolve differences in the ratings by mathematically averaging them. Only the numbers given in this manual are acceptable values.

The time required to rate a given task will vary, depending on the nature of the task, the experience of the rater, and the extent and nature of the documentation describing the task. For planning purposes, however, an overall average time of from 10 to 12 minutes per task should be used as lower and upper estimates.

What Is Required To Do Task Ratings?

The primary reference for rating a given task is the task summary. To minimize differences of judgment about a task's characteristics, this summary should be current, complete, and explicit (i.e., in conformity with TRADOC REG 351-11). It should list the conditions under which the task is performed, the standards to be achieved, and the performance measures for evaluating the soldier on that task. Use of a job aid, if any, should be noted specifically (usually in the conditions section) as well as the need to do all or some of the steps of the task in a particular sequence. Also, any time requirements for completing the task (or parts of it) should be specifically noted in the task summary.

In the absence of a task summary that covers all the points just noted, the rating procedure will be more difficult to carry out. In particular, tasks that involve essentially mental processes--soft-skill tasks—may not be described in as much detail as tasks involving essentially manual or physical procedures. It is more difficult to define (and thus to evaluate) with the same degree of precision a soft-skill task such as "Evaluating the Conduct of Training" or "Quelling a Riot" than a hard-skill task such as "Assembling an M16A1 Rifle." Tasks performed at higher skill levels (E-5 and above), where supervisory and leadership qualities tend to predominate, present similar problems for those who must describe them in specific and concrete terms. However, if a task can be objectively evaluated--if observable performance measures can be identified and judged with specific criteria—the rating method can be used.

If the raters find that they do not have all of the information needed to do the rating, they must supply the missing information or put the task aside. Questions concerning task characteristics cannot be omitted simply because required information is ambiguous or unavailable.

The rating method predicts task proficiency as defined by a standardized performance evaluation of the task. It addresses task performance under field or work conditions only to the extent that conditions under which performance is tested match actual job conditions. On some tasks (e.g., office duties)

test and field conditions may be very similar; on others (e.g., combat tasks) they may be quite different. When rating a task the raters should use the doctrinally defined test conditions, standards, and measures as the best description of how the task should be performed. For example, if a task requires the use of a job aid during testing, then the task should be scored as having a job aid, even if soldiers in the field do not always use such an aid.

Whenever it is necessary to adjust a task summary in order to rate a task, a record should be kept of precisely what was deleted, added, modified, or assumed so that others responsible for that task summary are aware of the changes. Raters, however, must avoid becoming task revisionists. No prediction at all is better than a prediction based on misleading or inaccurate information.

Two kinds of tasks may prove difficult to rate: (1) those performed under a variety of conditions (e.g., day/night, stationary/moving) and (2) those performed by more than one soldier. For tasks performed under multiple conditions, it may be necessary to provide separate ratings for each condition. Separate ratings should be provided whenever changes in task conditions also change task characteristics.

A task performed by a group of soldiers or involving interaction between more than one soldier can be rated. However, the individual roles of the soldiers must first be defined as discrete tasks so that each task can be rated separately. For example, tasks in which soldiers must communicate with one another, such as calling for and shifting indirect fire, can be rated from the position of the soldier transmitting the target information or of the soldier receiving and then responding to the information. Although the successful completion of the task requires that both soldiers perform their roles correctly, either soldier could be tested for the portion of the task for which he or she is responsible.

How Can Task-Retention Predictions Be Used?

The rating method produces a scale score which, in turn, can be converted into an estimate of unit proficiency on a task after a period of no practice. The scale score is produced by adding the rating scores for the task on the 10 rating questions. To convert the scale score to a retention prediction the rater should refer to Tables 1 and 2. The rater first locates the number closest to the total scale score in the left column on the table. The rater then locates the desired interval of no practice (see Table 1 for months, Table 2 for weeks) in the top row of the table. The number at the intersection of the selected column and row is the retention prediction for the task. The prediction is expressed as the expected percentage of soldiers in the unit able to perform the task correctly after the given interval of no practice.

For example, if a task has a total scale score of 130 and the rater wishes to know the percentage of a unit able to perform the task after 1 month, Table 1 indicates a predicted retention rate of 70%. For the same task, the predicted percentage of soldiers able to perform the task correctly after 3 months of no practice is 35%; after 6 months, 12%; and after 12 months, 1%.

These predictions always pertain to groups and not to the individual soldier. Although the ratings cannot be used to predict the performance of an

Table 1

Performance Prediction Table: Months

Total Score from Answer Sheet	Months Since Last Performance *											
	1	2	3	4	5	6	7	8	9	10	11	12
180 +	100	100	100	100	100	100	100	100	100	100	100	100
175	97	95	92	90	87	85	83	81	79	77	75	73
170	94	90	85	81	76	72	69	65	62	59	56	53
165	92	85	78	72	66	61	56	52	48	44	40	37
160	89	80	71	64	57	51	45	40	36	32	29	26
155	86	75	64	56	48	42	36	31	27	23	20	17
150	83	70	58	49	40	34	28	24	20	16	14	11
145	80	65	52	42	34	27	22	17	14	11	9	7
140	77	60	46	36	27	21	16	12	10	7	6	4
135	74	55	40	30	22	16	12	9	6	5	3	2
130	70	50	35	25	17	12	8	6	4	3	2	1
125	67	45	30	20	13	9	6	4	2	1	1	0
120	63	40	25	16	10	6	4	2	1	1	0	0
115	59	35	20	12	7	4	2	1	0	0	0	0
110	54	29	16	8	4	2	1	0	0	0	0	0
105	50	25	12	6	3	1	0	0	0	0	0	0
100	44	20	8	4	1	0	0	0	0	0	0	0
95	38	15	2	0	0	0	0	0	0	0	0	0
90	31	10	3	1	0	0	0	0	0	0	0	0
85	22	5	1	0	0	0	0	0	0	0	0	0
80 or less	3	0	0	0	0	0	0	0	0	0	0	0

*Performance at "GO" level of Proficiency

Table 2

Performance Prediction Table: Weeks

Total Score from Answer Sheet	Weeks Since Last Performance *																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
180 +	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
175	99	98	98	97	96	96	95	95	94	93	93	92	92	91	90	90	89	89	88	87	87	86	86	85	85	84
170	98	97	96	94	93	92	91	90	88	87	86	85	84	83	82	81	79	78	77	76	75	74	73	72	71	71
165	97	96	94	92	90	88	86	85	83	81	79	78	76	75	73	72	70	69	67	66	65	63	62	61	60	58
160	97	94	91	89	86	84	82	80	77	75	73	71	69	67	65	64	62	60	58	57	55	54	52	51	49	48
155	96	93	89	86	83	80	77	75	72	69	67	64	62	60	58	56	54	52	50	48	46	45	43	42	40	39
150	95	91	87	83	80	76	73	70	66	64	61	58	56	53	51	49	46	44	42	40	39	37	35	34	32	31
145	94	89	85	80	76	72	68	65	61	58	55	52	49	47	44	42	40	37	35	34	32	30	28	27	26	24
140	93	88	82	77	72	68	63	60	56	52	49	46	43	40	38	36	33	31	29	27	26	24	23	21	20	19
135	92	86	79	74	68	63	59	55	51	47	43	40	37	35	32	30	28	26	24	22	20	19	17	16	15	14
130	91	84	77	70	64	59	54	50	45	42	38	35	32	29	27	25	22	21	19	17	16	14	13	12	11	10
125	90	81	74	67	60	54	49	45	40	36	33	30	27	24	22	20	18	16	15	13	12	11	10	9	8	7
120	89	79	70	63	56	50	44	40	35	31	28	25	22	20	17	16	14	12	11	10	9	8	7	6	5	5
115	87	76	67	59	51	45	39	35	30	26	23	20	18	15	13	12	10	9	8	7	6	5	4	4	3	3
110	86	74	63	54	47	40	34	29	25	22	19	16	14	12	10	8	7	6	5	4	4	3	3	2	2	1
105	84	70	59	50	42	35	29	25	21	17	14	12	10	8	7	6	5	4	3	3	2	2	1	1	1	1
100	81	66	54	44	36	29	24	20	16	13	10	8	7	5	4	4	3	2	2	1	1	1	0	0	0	0
95	78	62	49	38	30	24	19	15	11	9	7	5	4	3	2	2	1	1	1	0	0	0	0	0	0	0
90	74	56	42	31	23	17	13	10	7	5	4	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0
85	68	47	32	22	15	10	7	5	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	42	17	7	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
75	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70 or less	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Performance at "GO" level of Proficiency

individual soldier or the mission-criticality of a specific task, they can be used to help answer some important questions for achieving effective training management:

- How quickly are specific tasks forgotten?
- Which tasks are most likely to be forgotten (or retained)?
- What percentage of soldiers will be able to perform a given task correctly after up to 1 year of no practice?
- When and how often should sustainment training be conducted?

Since it is not possible to sustain every soldier continually on every task, choices must be made. The ratings produced by this method will help trainers in the field make their choices with greater ease and accuracy.

II. INSTRUCTIONS FOR THE PAPER-AND-PENCIL VERSION

The task-rating method has been developed in both a paper-and-pencil version (described in this manual) and a computer-based version. This manual is intended to serve as a basic guide for those who rate tasks to determine the level of retention. Although this manual contains the information needed to use the rating method properly, situations may arise for which adequate guidance is not provided. Further assistance may be obtained from the U.S. Army Training Board at Comm (804) 878-4658 or AV 927-4658.

The Task-Rating Procedure

The task-rating procedure contains 10 questions, each having from two to four choices of answers, and a "Definitions" section designed to clarify the meaning of each question and to help with the selection of the most appropriate answer. It is important to read all of the "Definitions" information before selecting an answer.

The paper-and-pencil version contains a Task Retention Rating Form (Figure 1) on which the answers to each question for each task are to be recorded.

Here is the step-by-step procedure to follow:

1. List the number designation and title of each of the tasks you are going to rate in the first two columns of the rating form. Use one line on the form for each task. You may shorten or abbreviate the task title. Enter the Military Occupational Specialty (MOS) or Specialty Code (SC) designation at the top of the form. If you are rating tasks in more than one MOS/SC, use separate rating forms for each MOS/SC.

2. Refer to the current task summary to obtain a description of each task you intend to rate. You may also use information found in referenced documents for each task.

Task Retention Rating Form

MOS: _____

		Scale Questions										
		1	2	3	4	5	6	7	8	9	10	
Task No.	Title	Job/Memory Aid Yes = 1 No = 0 (GO TO 3)	Job/Memory Aid Quality Excellent = 56 (GO TO 6) Very Good = 25 Marginally Good = 2 Poor = 1	Number of Steps 1 Step = 25 (GO TO 6) 2 to 5 Steps = 14 6 to 10 Steps = 12 More than 10 = 0	Sequence None Are = 10 All Are = 5 Some Are and Some Are Not = 0	Feedback For All Steps = 22 For Most Steps = 19 Only a Few = 11 None = 0	Time None = 40 Easy = 35 Difficult = 0	Mental Requirements Almost None = 37 Simple = 28 Complex = 3 Very Complex = 0	Number of Facts None = 20 A Few (1-3) = 18 Some (4-8) = 13 (More Than 8) = 0	How Hard to Remember Not Applicable = 34 Not Hard At All = 31 Somewhat Hard = 12 Very Hard = 0	Motor Control Requirements None = 2 Small = 0 Considerable = 16 Very Great = 3	Total Score

Figure 1. Task retention rating form.

3. Read the first question and the associated "Definitions" section. Review the supporting documentation for each task as needed to arrive at an answer. Note the scale value for the answer you selected. Write that scale value in the box in the rating form corresponding to that task and question.

4. Continue in this manner until you have answered all 10 of the questions for Task 1 and have entered the appropriate scale values on the rating form. Depending on your answers you may be asked to skip certain questions. Follow the instructions given for each question.

5. Add the individual scale values for Task 1 and enter the total in the Total Score column of the rating form.

6. Follow the same procedure for the remaining tasks you wish to rate.

7. Review the ratings given to each task by other raters. Resolve differences and document any changes in or assumptions made about a task. When the scale values for each question and the final score have been agreed on by the raters, record them on a separate rating form noting that it is the "Approved Task Rating Form." Supplementary documentation should be attached to this rating form to support the ratings given.

To convert the final ratings to performance retention predictions, follow the instructions in section IV of this report.

Figure 2 shows the decision algorithm that is built into the series of 10 questions. As you go through the questions, you will note that the instructions contain specific guidance with respect to the decision points shown in the chart. It is important to follow these instructions carefully.

Question 1. Presence of Job Aids

Are job or memory aids used by the soldier in performing (and in the performance evaluation of) this task?

Answer choice	Scale value
• Yes	1
• No	0

Definitions. Job and memory aids, such as the following, are designed to guide or facilitate the soldier in on-the-job performance and to minimize the need for recall:

- Memory joggers learned in school, such as S - A - L - U - T - E.
- Technical manuals or pamphlets (when used on the job as an aid to performing the task properly).
- Labels or instructions printed on or attached to equipment or containers.

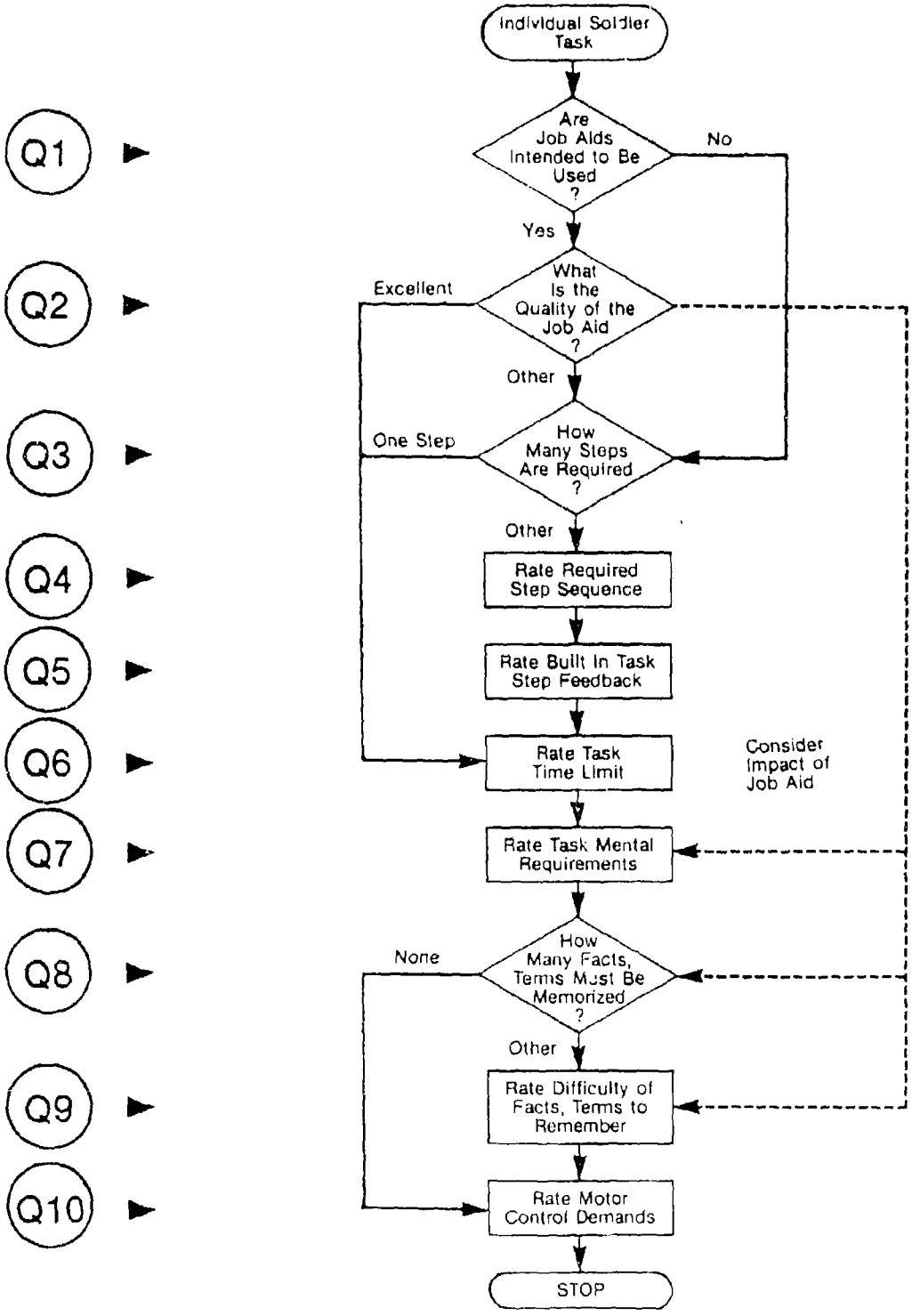

Figure 2. Decision algorithm.

- Checklists, flowcharts, worksheets, decision tables, and system-fault tables.

- Manuals published by manufacturers to be used while performing maintenance tasks on equipment.

- Instructions on forms telling how to complete them. (The form itself is not a job aid, even though it has headings that indicate what should be entered on the form. The form is considered an integral part of the task itself.)

The key to answering Question 1 accurately lies in how the task is intended to be evaluated and performed. For example, a technical manual is intended to be used while performing most maintenance tasks. That is how these task are taught and how they are evaluated. If a job or memory aid is not used while performing a task, and none is used in evaluating that task, then the answer to this question should be "no."

All reference-dependent tasks (i.e., tasks for which required references are noted in the conditions section of the task summary) should be considered job aided.

Tools or equipment needed to perform a task are not job aids. However, if a supervisor is permitted to aid a soldier during the task performance evaluation, the supervisor should be considered a job aid.

Write the scale value (1 or 0) for the answer you select in column 1, "Job/Memory Aid," of the rating form.

If your answer to this question was "no" (0), skip the next question and go to Question 3.

If your answer was "yes" (1), answer Question 2. You will be reminded on several other questions that a job or memory aid is used to perform this task. The rating of these questions will depend on how much support is provided by the aid (the topic of Question 2).

NOTE: If there is no job or memory aid, do not answer this question. Go to Question 3.

Question 2. Quality of Job Aids

How would you rate the quality of the job or memory aid?

Answer choice	Scale value
• Excellent. Using the job/memory aid, a typical soldier can do the entire task correctly with no additional information or help.	56
• Very good. With the job/memory aid, a typical soldier would need only a little additional information to complete the task.	25

Answer choice	Scale value
• Marginally good. Even with the job/memory aid, a typical soldier would need important additional information to complete the task.	2
• Poor. Even with the job/memory aid, a typical soldier would need a great deal of additional information to complete the task.	1

Definitions. This question requires you to think about whether the job or memory aid can actually lead the soldier through the entire task without error.

Several dimensions help to define the quality of a job or memory aid:

- Clarity--An excellent job aid presents the information a soldier needs to perform the task in a way that soldiers can understand; that is, the language and terminology match the soldiers' level of understanding and reading ability. If necessary, pictures, diagrams, tables, and charts are used to present critical information.

- Completeness--An excellent job aid provides all the information soldiers need to do the task. A complete job aid tells what, when, and how to perform at a necessary level of detail. An aid that covers only a portion of a task very well is still less than excellent if other portions are left uncovered or are covered poorly.

- Usability--An excellent job aid is usable while the job is actually being performed. For example, a detailed, well-written technical manual is still less than an excellent job aid if the soldiers cannot take time to read it or if it is physically impossible to use the aid while performing the task. In the same way, a job aid may be excellent under some conditions but poor under others (e.g., darkness).

In some cases a task may have more than one job aid. The rater should consider the overall excellence of job aids in relation to the entire task. Only if the job aids, taken together, provide clear, complete, and useful coverage of the whole task can the rating on this question be "excellent."

The following examples for the task "Turn on Electrical Test Panel" may help in making your choice:

Excellent job aid--Easy-to-read instructions printed clearly on the electrical test panel itself, telling when to do the task, what to do, how to do it, and in what order to do each step. Pictures are used to help locate things.

Very Good job aid--A booklet that provides basically the same information but does not show where the knobs and switches are located. Operator errors are more likely.

Marginally good job aid--Printed technical instructions that mix unnecessary information about the test system with the necessary information. No pictures or diagrams are provided.

Poor job aid--Technical reference manuals that give general principles of operation using complex language--soldiers must try to determine the actual procedure for themselves.

Choose your answer using the above guidance and enter the scale value for that answer on the rating form under column 2, "Job/Memory Aid Quality."

If you select "excellent" as the answer to this question, skip the next three questions. Look at these three questions now to see if your assessment of the job aid is accurate. In effect, if a job aid is excellent, the task has only one step (read job aid), has no particular sequence to remember (job aid tells you), and has lots of built in feedback (job aid tells you if you are doing each step correctly). If you have any doubts about whether the job aid that you have rated "excellent" meets these standards, downgrade your rating to "very good" and answer the next three questions.

NOTE: If you rated the job aid as "excellent," do not answer this question or the next two questions. Go to Question 6.

Question 3. Number of Steps

Into how many steps has the task been divided?

Answer choice	Scale value
• 1 step	25
• 2 to 5 steps	14
• 6 to 10 steps	12
• More than 10 steps	0

Definitions. For purposes of this rating, use the number of evaluated performance measures listed in the task summary under the Evaluation Guide as the number of steps. Nonevaluated substeps should be counted, but do not include performance measures relating to whether the soldier performed the task steps in sequence or within a certain time period. These measures are viewed only as scoring steps and not as task steps for this question.

If the reference material does not provide sufficient information, or if you feel that a task has not been accurately divided into performance steps, the following guidance may be helpful:

- A step is a separate physical or mental activity within a task and has a well-defined, observable beginning and end. A step must be performed to complete a task correctly. Thus, "Identifying a Tank" is one step, even though a number of mental operations are needed to arrive at the correct answer (e.g., note location of turret, count number of road wheels, etc.). These operations, however, are not observable and are not scored as separate steps.

- Steps should include all safety-related activities, even though they are not directly part of the task. The step "Check Backblast Area" is an observable step and is graded when measuring proficiency on preparing the LAW for firing.

- Tasks involving assembling or disassembling a piece of equipment tend to be multistep tasks. "Assembling the M16 Rifle" is an example of a multistep task and is scored as such.

- A step in a higher skill level task (E-5 or above) may be a separate task at a lower skill level. This is as it should be; one must assume that the procedure was learned earlier and is no longer a separate task. For example, "Identify Terrain Features" is assumed at higher skill levels and is simply one step in a task such as "Navigate With a Map." At Skill Level 1, it is a separate task with many steps of its own.

Note that Question 3 is skipped if the job aid for this task was judged "excellent." This is consistent with the definition of an excellent job aid as one that provides the soldier with complete information about each of the steps of the task. Obviously, the number of steps in a task would be irrelevant to the soldier who had forgotten them if the job aid presented them clearly and completely.

If steps are repeated in a task, the instruction to repeat them should be counted as a step, but the repeated steps themselves should not be recounted. For example, when shifting indirect fire the soldier repeats the steps of estimating range and of communicating information to the gun crew several times until the target is destroyed. Each repetition does not constitute a separate step.

If it is agreed that there are clearly more than 10 steps to a task, it is not necessary to resolve differences of opinion about the actual number. Any task that has more than 10 steps is given a 0 scale value regardless of the actual number.

Determine your answer. Enter the scale value for this answer on the rating form in column 3, "Number of Steps."

If you select the first answer (one step), skip to Question 6.

NOTE: If the task has only one step, go to Question 6.

Question 4. Sequence Requirements

Are the steps in the task required to be performed in a definite sequence?

Answer choice	Scale value
• None are	10
• All are	5
• Some are and some are not	0

Definitions. Some tasks are composed of steps that can be performed in any sequence. For example, "Identify Terrain Features on a Map" is a task that is not scored for sequence in the evaluation guide of the task summary. Give such tasks a scale value of 10.

Other tasks, such as "Splint a Fracture," are made up of steps that have only one correct sequence. Failure to follow the particular sequence results in a "NO GO" on that task. Give these tasks a scale value of 5.

Give a task that is a mixture of sequenced and nonsequenced steps a scale value of 0. "Perform Operator Maintenance on an M16A1 Rifle" is such a task. Only Steps 1-5 are scored for sequence.

The reasoning is that it is easier to remember how to do a task when sequence does not matter, but that if sequence is scored, it is easier to remember a specific sequence for all steps than for only some of the steps.

If a task or parts of it are supposed to be performed in sequence, there must be a statement to that effect in the task summary (e.g., "Do, in order, all steps to clear the object from the casualty's throat."). In the absence of any statement about sequence, assume that sequence for that task is not scored, even though there may be a natural or preferred order for doing the steps.

Choose your answer. Enter the scale value for your answer in column 4, "Sequence", of the rating form.

NOTE: If the task has only one step, skip this question and go to Question 6.

Question 5. Feedback

Does the task provide built-in feedback so that you can tell if you are doing each step correctly?

Answer choice	Scale value
• Has built-in feedback for all steps	22
o Has built-in feedback for most steps (50% and above)	19
• Has built-in feedback for only a few steps (up to 50%)	11
• Has no built-in feedback	0

Definitions. Examples of tasks that provide built-in feedback include the following:

- Disassembling a piece of equipment in which removing one section automatically uncovers the next section (e.g., opening a container to remove contents).

- Equipment operation in which the steps form a logical or natural progression (e.g., radio operators are expected to adjust or turn on several dozen switches in a certain order when powering up their radio

sets; however, the equipment is arranged so that the operator can follow a natural right-to-left or left-to-right progression).

- Assembling a subpart that does not fit the larger assembly, thus indicating that some earlier step was incorrect.

- Performing any task where there is some observable effect due to the soldier's actions (e.g., warning light, buzzer, meter reading, and the like).

Completion of some tasks provides an automatic check on the correctness of task performance. "Changing a Tire" has some of those characteristics (e.g., parts left over, wheel does not turn). The impact of an artillery round has similar feedback. However, such end-of-task feedback may not help the soldier to perform the steps of the task correctly in the first place and should not be considered in answering this question.

The important point to consider in selecting an answer to this question is whether the feedback to the soldier indicates correctness of performance at each step. Feedback that simply indicates that the step was completed is not the kind of feedback that this question is addressing.

Steps that have the least built-in feedback tend to have many branching routines (if A, then B), or have safety checks that break the flow of a task's steps (e.g., "Place the selector on SAFE before cleaning the rifle").

Do not confuse the feedback that a performance test administrator may give to a soldier to allow him to continue the test after an error is made with the feedback that is being addressed by this question. Question 5 concerns only feedback that is an inherent part of the task, not an artifact introduced by test conditions.

Before answering this question you may wish to look back to Question 3 to see how many steps you identified for the task. You need to consider each of them in arriving at the correct answer to this question.

Enter the scale value for your answer on the rating form in column 5, "Feedback."

Question 6. Time Requirement

Does the task or part of the task have a time limit for its completion?

Answer choice	Scale value
• There is no time limit	40
• There is a time lmit, but it is fairly easy to meet under test conditions	35
• There is a time limit and it is difficult to meet under test conditions	0

Definitions. The first choice means that no time limit has been established for the task or any part of the task, so that a "GO" may be achieved even though one soldier may take much longer to do the task than another soldier does. This choice is also appropriate when a time limit is so liberal that no one ever fails to meet it.

The second choice applies to those tasks, such as "Assemble the M60 Machinegun," that have a time limit that some soldiers find difficult to meet. In this case, the task summary has set a time limit that pressures the average soldier a bit, but only a few soldiers would get a "NO GO" because of it.

The third choice is for tasks that have a time limit that is difficult to meet. Safety and combat-related tasks, such as "Sight Target Through the Gunner's Telescope" within 10 seconds, fall into this category. Soldiers tested on this kind of task often get a "NO GO" on the oasis of time alone.

Time limits, if any, are indicated in the task summary in the standards section or as the last item in the list of performance steps to which they apply. Some examples are "Put On, Clear, and Check Mask" within 9 seconds, or "Complete Steps 1 Through 5 in 9 Seconds or Less." (Remember, however, that the time limit statement itself is not counted as a step.) If no time limit statement is found in the task summary, assume that there is none.

Question 7. Mental Requirement

How difficult are the mental processing requirements of this task?

Answer choice	Scale value
• Almost no mental processing requirements	37
• Simple mental processing requirements	28
• Complex mental processing requirements	3
• Very complex mental processing requirements	0

Definitions. This question usually cannot be answered entirely on the basis of the task summary (as could the time and sequence questions), but the correct choice must often be deduced from a careful reading of the summary and first-hand knowledge of the task itself. This question gets at the difficulty of the thought processes that a soldier must carry out during task performance. Such processes are often described by terms such as thinking, reasoning, analyzing, judging, inferring, and problem solving.

Be careful not to confuse this question with the next two questions that deal with the number of facts, terms, etc., that must be memorized and the difficulty of memorizing those facts, terms, etc. Here we are concerned only with what you have to do with the recalled information to perform the task correctly.

A task requires almost no mental processing if it is essentially physical or highly repetitive (e.g., "Marching in Line," "Saluting").

A task requires simple mental processing if it involves making gross comparisons (e.g., estimating relative size, weight, or distance; performing simple computations).

Complex mental processes require the soldier to make a choice or decision based on subtle but discrete clues (e.g., setting priorities for fixed targets, identifying different types of aircraft or vehicles).

A task requires very complex mental processes if it requires rapid decisions based on detailed, technical information, often under stress (e.g., planning an attack, troubleshooting complex equipment).

In answering this question, consider the impact of a job or memory aid on the thinking requirements of this task. Note that job aids are generally less helpful in the area of higher thought processes than in the areas of rote memory or proceduralized (step-following) tasks. Nevertheless, an excellent aid may reduce a very complex mental-processing task to a complex mental-processing task.

Question 8. Number of Facts

How many facts, terms, names, rules, or ideas must a soldier memorize in order to do the task?

Answer choice	Scale value
• None (or the job/memory aid provides all necessary information)	20
• A few (1-3)	18
• Some (4-8)	13
• Very many (more than 8)	0

Definitions. This question addresses the number of isolated pieces of information a soldier must remember to do the task, not the difficulty of remembering them, which is addressed in the next question.

Examples of the types of information that may have to be remembered include the following:

- Military nomenclature (terms)
- Conversion formulas
- Codes or call numbers
- Technical names, specifications, or tolerances
- Doctrinal principles or rules of thumb.

Remember to consider the impact of the job or memory aid (if any) in answering this question. If facts, terms, etc., are needed to do the task, but some or all are covered in the job aid, your answer should reflect this.

The steps required to perform the task should not be considered in answering this question. The facts, terms, etc., that must be remembered to do these steps are being addressed by this question, not the steps themselves.

This question (and Question 9) does require some judgment about the level of experience of the typical soldier doing the task being rated. One could safely assume that the typical soldier who has completed AIT knows basic military terminology and concepts, and that these should not be included in answering this question. Those facts, terms, etc., unique to the task being rated, however, should be included.

Here again, if the number of facts, etc., is obviously greater than eight, there is no need to seek consensus on this question—it will get a scale value of 0 regardless of the outcome.

Select your answer and then enter the scale value for that answer in column 8, "Number of Facts."

Question 9. Difficulty of Facts

How hard are the facts, terms, that must be remembered?

Answer choice	Scale value
• Not applicable--There are none to remember, or the job or memory aid provides all of the needed information.	34
• Not hard at all--The information is simple.	31
• Somewhat hard--Some of the information is complex.	12
• Very hard--The facts, rules, terms, etc., are technical or specific to the task and must be remembered in exact detail.	0

Definitions. This question rates the difficulty of the facts, terms, etc., needed to do the task (even if there are only a few).

Facts and terms that have a close connection to the task itself are more likely to be remembered. For example, the terms firing pin and whip antenna have a logical relationship to their function and are easy to recall. Specific, detailed, or technical information that is unrelated to the task is more difficult to recall. Call signs and radio frequencies are examples of difficult-to-recall information because they are purposely assigned at random but must be used with precision. Also, unorganized facts and terms (e.g., much military nomenclature) are more likely to be forgotten than facts and terms that are part of a system (e.g., the phonetic alphabet).

The amount of help provided by job and memory aids applies directly to this question. The aids are often designed specifically to help the soldier recall information that is quickly forgotten (e.g., S-A-L-U-T-E).

Choose your answer and then enter the scale value for your answer in column 9, "How Hard to Remember."

Question 10. Motor Control Requirement

What are the motor control demands of the task?

Answer choice	Scale value
• None	2
• Small but noticeable degree of motor control required	0
• Considerable degree of motor control needed	16
• Very large degree of motor control needed	3

Definitions. This question concerns the level of precision and/or accuracy of finger, hand, and arm movements, not large body movements. Thus a task that involves only sheer physical strength or simple, reflexive actions (e.g., pushing, lifting, carrying) would be answered "none."

A small but noticeable degree of accuracy/precision is required by tasks such as driving a nail or adjusting a carburetor screw.

A considerable degree of motor control is needed for tasks such as typing, driving a manual transmission car, or tracking a moving target.

A task requiring a very large degree of motor control is the repair of a very delicate piece of equipment, such as a microcircuit chip, or sending Morse code using a key.

Some tasks combine both a strength component and a motor control component. For example, a fairly heavy piece of equipment may have to be positioned in a precise location. In such cases, a value of "considerable" or even "very large" would be appropriate, depending on the degree of motor control required.

Almost all tasks require some speaking skills, and many tasks require written skills as well. While these skills are indeed complex motor demands, they are considered to be already in the repertory of the typical soldier and therefore should not be included in making this rating. However, typing or sending Morse code may be an integral and unique part of a task and therefore should be considered in selecting a scale value for this question.

Although the scale values associated with this question may appear to be incorrect because they are not in descending order as are all the others, they are, in fact, the correct values. A task with a small degree of motor control proves to be more difficult to remember than a task with a considerable degree of motor control. This finding is reflected in the low value for the former (0) and the high value for the latter (16).

Select your answer and enter the scale value in column 10, "Motor Control Requirements."

III. CALCULATING A TOTAL SCORE

This section completes the instructions on the rating procedure itself. Check back to make sure you answered all the questions that apply to the task being rated. The questions you skipped (if any) should be blank on the rating form. All others should have a 0 or a number written in. If you rated the first question a 1, there should be a rating for the second question; if you rated the first question a 0, the second question should be blank. If Question 2 has a rating of 56, the next three questions should be blank.

Remember, if you change a rating for one question then you must also change all the other questions that would be affected by that change and adjust your total score accordingly. (See Figure 2 for a graphic representation of how the questions interact.)

The total score should reflect the input of all team members. When this process has been completed, a new rating form, labeled "Approved Task Rating Form," should be prepared and dated. That form will be the one kept for future reference. Subsequent changes in how a task is performed as reflected in the task summary will probably require that the task-retention rating be revised. At that point a new form, reflecting those changes, should be prepared and dated.

IV. USING THE PERFORMANCE PREDICTION TABLES

The two performance prediction tables (Tables 1 and 2) provide the performance predictions for rated tasks. The numbers within the body of the table represent the expected percentage of soldiers in a unit able to perform a task correctly after up to 1 year of no practice since a task was last performed correctly.

Table 1 presents these predictions at monthly intervals, up to 12 months; Table 2, at weekly intervals, up to 26 weeks.

To find a specific task retention prediction, first locate the score in the left column that corresponds closest to the obtained total score. Then read across the column heads until you reach the time interval you are concerned about. The entry at that point will be the percentage of soldiers who could be expected to perform the task correctly at that time interval.

For example, the total score from the rating form on task X is 140. If you want to know the predicted percentage of soldiers who can still perform the task 4 months after they last practiced it, you will find that the entry in Table 1 under "4" is 36%. The entry in Table 2 for 16 weeks is also 36%.

A second way to use the tables is as follows: If a task has a score of 140, how often should sustainment training be provided to keep approximately 50% of the soldiers proficient on that task at all times? Looking at the line on Table 1 next to the value 140, we see that 46% is in the column headed "3." Thus, the training frequency required to sustain a level of proficiency of approximately 50% on that task is 3 months.

A third way to use the tables is to determine which level of proficiency to expect in your unit if you can provide sustainment training only every "X" months or weeks. By looking at the total score for each of your tasks you can see the percentage for each task under the appropriate months (Table 1) or weeks (Table 2) column. For those tasks with a rating of 130, for example, the percentage of proficiency at a 4-month frequency-of-training schedule is 25%; for tasks with a rating of 170, 81%, and so on.